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| 13. ABSTRACT (Maximum 200 words) The conference on "Nonlinear Dynamics in Optical Systems" (NDOS'95) was held at Rochester during June 5-7, 1995. About 150 scientists and graduate students from more than 10 countries attended the conference. A joint session was held on June 7, with the "Coherence and Quantum Optics" Conference. | | | | | |
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FINAL REPORT on NDOS '95 Conference on Nonlinear Dynamics in Optical Systems

The conference on Nonlinear Dynamics in Optical Systems (NDOS '95), was held in Rochester, New York, during the period June 5-7, just preceding the Seventh Coherence and Quantum Optics conference (CQO7), which was scheduled for June 7-10, 1995. On June 7, joint sessions were held with CQO7 that were planned in consultation with the organizing committee for that conference. The historic Coherence and Quantum Optics conferences have been held, since its beginning, seven times, consecutive meetings about six years apart. This year provided a rare opportunity to hold NDOS as a satellite meeting in concurrence with CQO7. As a historical footnote, three meetings on the general topic of nonlinear dynamics in optical systems have been organized before NDOS'95. The first was the Optical Instabilities conference in Rochester (1985). The second meeting was in Afton, Oklahoma (1990) with the title Nonlinear Dynamics in Optical Systems (NDOS). This title has been retained for the third and fourth meetings held in Alpbach, Austria (1992) and Rochester, NY (1995). These were highly successful meetings and demonstrated the growing interest in both the basic science and applied engineering aspects of optical instabilities. All the meetings were typically attended by 150 participants, and represented the truly international nature of this field of research because of the geographical distribution of the participants..

NDOS has come to be recognized as a unique meeting point for leading researchers in dynamical systems with expertise in the fields such as optical instabilities, chaos and its control, optical solitons and their applications, and laser physics. Advances in the mathematical discipline of dynamical systems have traditionally been aimed at fluid dynamics scientists and often at those studying the dynamics of chemical reactions and mechanical systems. In the past decade it has become evident that optical systems provide a novel setting for the exploration of nonlinear dynamics over a vast range of time scales and in one, two and even three spatial dimensions. It is perhaps the only meeting that has a goal of developing strong interdisciplinary ties between dynamical systems

researchers in the mathematical sciences and optical scientists and engineers. NDOS meetings have focused the attention of both communities on the similarities between fluid dynamical and optical pattern formation mechanisms, demonstrating the profound and deep connections of these disciplines. At the NDOS'95 meeting in Rochester, NY, reports on the control of chaotic behavior of laser systems and transverse pattern dynamics once again demonstrated the direct application of algorithms developed in a mathematical context to optical systems.

CONFERENCE ORGANIZATION

The conference was organized by a group of five scientists, all members of the Organizing Committee. They were helped in the selection of topics and invited speakers by the Advisory Committee. The program committee members helped in the review and selection of the contributed papers. The members of the three committees are listed here.

ORGANIZING COMMITTEE

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 M. Piché (Québec)
 R. Roy (Atlanta)

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 M. Soskin (Kiev)
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 J. Tredicce (Nice)
 C. Weiss (Braunschweig)
 H. Winful (Ann Arbor)

CONFERENCE PROGRAM

The meeting consisted of oral and poster presentations and discussions of recent developments on the dynamics of nonlinear optical systems. The reader is referred to the **Conference Digest** for a detailed listing of the session topics and the summary of the invited and contributed papers. A list of invited papers is included here for providing a flavor of the topics covered by NDOS'95.

Photorefractive Spatial Solitons, Mordechai Segev, *Greg Salamo, **George Valley and ***Bruno Crosignani, Princeton University, *University of Arkansas, **Hughes Research Laboratories, ***Universita' dell'Aquila

Synchronization of Chaotic Lasers in Master-Slave Relation, Maki Tachikawa, Toshiki Sugawara, Takayuki Tsukamoto and Tadao Shimizu, University of Tokyo

Transverse-Pattern Dynamics in Short-Pulse Lasers, Leonid A. Melnikov, Chernyshevsky State University

Laser Cooling: Physical Mechanisms and Ultimate Limits, C. Cohen-Tannoudji, Collège de France

Controlling Chaotic Lasers, R. Roy, Georgia Institute of Technology

Quantum Aspects of Optical Pattern Formation, L.A. Lugiato, Universita de Milano

Chaos in Semiconductor Lasers With Optical Injection, A. Gavrielides, Phillips Laboratory

Nonlinear Optical Properties of Quasi-One Dimensional Magneto-Excitons, Daniel S. Chemla, University of California at Berkeley

Phase-Controlled Photocurrents in Semiconductors, E. Dupont, P.B. Corkum and *H.C. Liu, National Research Council

Spatial Solitons in Wide-Aperture Nonlinear Optical Systems, N. N. Rosanov, S.I. Vavilov State Optical Institute

Cooperative Synchronization in a Laser Array with Eigenfrequency Spread, A. Napartovich, S.Y. Kurchatov and V.V. Likhanskii, Troitsk Institute for Innovation and Fusion Research

Financial Support

An important objective of NDOS'95 was to encourage the participation of the graduate students as much as possible. As a result, financial support was needed to cover local expenses for both the graduate students and the invited speakers (travel expenses of the foreign invited speakers were paid by the conference funds). Financial support was requested from both the AFOSR and ONR. The organizing committee was gratified and is thankful to both sponsors for their generous support.

Graduate students supported by the external funds

| Name | Institute | Amount |
|--------------|---------------------------------|---------------|
| R. Bridge | University of Rochester | \$150 |
| R. Essiambre | University of Rochester | \$150 |
| Z. Gilles | Georgia Institute of Technology | \$284 |
| D. L. Hart | Georgia Institute of Technology | \$284 |
| A. Hohl | Georgia Institute of Technology | \$284 |
| L. Liou | University of Rochester | \$150 |

| | | |
|-------------------|---------------------------------|-------|
| J. Marciante | University of Rochester | \$150 |
| M. Moller | Georgia Institute of Technology | \$284 |
| A. Pinto | University of Rochester | \$150 |
| A. Ryan | University of Rochester | \$150 |
| A. Teixeira | University of Rochester | \$150 |
| S. Thornburg | Georgia Institute of Technology | \$284 |
| P. van der Linden | Georgia Institute of Technology | \$284 |
| Q. L. Williams | Georgia Institute of Technology | \$284 |
| M. Yu | University of Rochester | \$150 |

Invited Speakers supported by the external funds

| | | |
|----------------|------------------------------------|-------|
| M. Tachikawa | NIST, Boulder, Colorado | \$284 |
| L. A. Melnikov | Chernyshevsky State University | \$284 |
| A. Napartovich | Trisk Institute, Moscow | \$309 |
| N. A. Loiko | Institute of Physics, Minsk | \$375 |
| M. Segev | Princeton University, Princeton | \$284 |
| D. S. Chemla | University of California, Berkeley | \$284 |

Other Participants supported by the external funds

| | | |
|----------------|-----------------------------------|-------|
| N. A. Loiko | Institute of Physics, Minsk | \$375 |
| I. V. Melnikov | General Physics Institute, Moscow | \$284 |
| N. N. Rosanov | Vavilov State Optical Institute | \$375 |
| L. Svirina | Institute of Physics, Minsk | \$375 |
| E. A. Viktorov | Vavilov State Optical Institute | \$284 |